Embryogenic callus formation and plant regeneration from immature embryos of some barley genotypes (*Hordeum vulgare* L.)

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ABSTRACT

Genotypic restrictions on plant regeneration from cultured cells have hindered the genetic transformation of most barley cultivars. Optimizing culturing protocols for some genotypes may facilitate their genetic transformation to produce transgenic plants with desired characters. Plant regeneration from embryogenic callus of six barley genotypes (Hordeum vulgare L.) was examined on four different media compositions. Regeneration was improved for all genotypes by separately autoclaving certain components of the culture media and using maltose as the carbon source. Medium No. 2 revealed the highest frequency of embryogenic calli (74.56%), shoots (26.58%) and regenerated plantlets (14.33%) across all genotypes. Genotypes Giza 124, Giza 126 and breeding line No. 6 revealed the highest regeneration frequency (9.83%, 9.53% and 10.70%, respectively). Using the intact or bisected immature embryos, as explants did not significantly affect the regeneration frequency of all genotypes. Enhancement in plant regeneration is expected to facilitate the transformation of commercial barley germplasm.

Key words: *Barley, Hordeum vulgare, immature embryos, embryogenic callus, plant regeneration.*

INTRODUCTION

Barley (*Hordeum vulgare* L.) is one of the world's major cereal crops ranking fourth behind wheat, rice and maize in terms of agronomic importance (Harwood, *et al.*, 2000). In Egypt, barley is the main cereal crop grown under rainfed conditions. It is regarded as one of the most tolerant crops for growing in irrigated soils of high salt concentration and under dry farming agriculture prevalent in Sinai and in the west coast of Egypt depending on the scanty winter rainfall. In Egypt, barley is mostly used for animal feed and rarely in human food, with approximately 20% being used for malting purposes. According to Agricultural Statistics (2001), barley is cultivated in Egypt in an area of 80,000 feddans of old lands and 20,000 feddans of new lands in addition to 250-300 thousand feddans of rainfed areas.

Application of genetic engineering methods for commercially important barley cultivars could play an increasingly important role in solving some fundamental challenges. This could include elevating yields by improving agronomic traits, such as enhancing pest, stress or herbicide resistance.